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NOTES ON THE BIRDS OF THE AU SABLE
VALLEY, MICHIGAN.

BY NORMAN A. WOOD AND EARL H. FROTHINGHAM.

THE recent discovery of the breeding of Kirtland's Warbler in the valley of the Au Sable River, Mich., has given that region a peculiar interest from an ornithological standpoint. The fact that this bird has remained so long unknown indicates that the bird life of the vicinity has been very little studied, and observations upon it should be of value.

These observations were made during two trips undertaken by Mr. T. G. Gale and the writer as follows: On June 13, 1903, we drove from West Branch, Ogemaw Co., Mich., to the Au Sable River, and stopped at the home of James Parmalee, three miles north of the village of Luzerne in Oscoda County. Exclusive of the river valleys, the country traversed is typical of this region. It consists of wide sand and gravel plains varied by morainal ridges and marshy depressions, and extensively dotted with burnt stumps and logs, which identify it as "old pine lands." Large areas are almost without ground cover; in others jack and Norway pines occur in scattered clusters interspersed with scrub scarlet oak and aspen, while the ground is hidden by thick growths of sweet fern, blackberry, and huckleberry bushes. The barrenness of the soil is attested by numbers of deserted farms.

At the river valley we found four general types of vegetation, each apparently dependent upon drainage and the elevation of the site above the river. The lowest of these occur on limited areas of bottom land, and is largely composed of elms and ashes, with a thick undergrowth of berry bushes and seedling hardwoods. Among the birds noticed in this vegetation were, Chestnut-sided and Black and White Warblers, Cedar Waxwings, Wood Pewees, Great Crested Flycatchers, Rose-breasted Grosbeaks, and Song Sparrows.

About ten or fifteen feet above the level of the river is a relatively dry terrace on which scrub oak and sweet fern grow in abundance.

This terrace continues for a distance of one hundred to two hundred yards from the river, and here we saw Robins, Kingbirds, Flickers, Cowbirds, Goldfinches, Vesper Sparrows, Chipping Sparrows, and Brown Thrashers.

From this terrace a steep, swampy slope covered with spruce, balsam, white cedar, and tamarack rises eighty to one hundred feet to a morainal topography, the greater part of which presents a dry, sandy surface supporting thickets of jack pine undergrown with sweet fern. Characteristic birds of the slope are the Black-throated Green Warbler, White-throated Sparrow, Whip poor-will, Hermit Thrush, Ovenbird, Song Sparrow, Hairy Woodpecker, and Ruffed Grouse; while among those of the higher, dry land are the Field Sparrow, Vesper Sparrow, Junco, Shore Lark, and Kirtland's Warbler. Several birds, including the Sparrow Hawks, the larger Buzzards, Blue Jays, and Chickadees were found to be of general distribution.

On the second day following our arrival, while walking among jack pines on a ridge about three hundred yards from the river, we heard a strange bird song which we traced to a warbler with which we were not familiar. We saw near by two other warblers of the same kind, both of which were singing. At eleven o'clock of the same day we drove from Parmalee's northwest to the north branch of the river, a distance of seven miles. During the first hour of the drive we heard the song at six or eight places along the road, and at last saw one of the warblers on a high, burned stump in a slashing. Mr. Gale shot the bird, which proved to be a breeding male. From this time on we saw no more of the warblers, which seemed to be confined to jack pine thickets. After our return, — June 21, — to Ann Arbor, the specimen was identified as Kirtland's Warbler¹ and placed in the University Museum.

The discovery of this breeding colony of Kirtland's Warbler, added to the fact that among the birds of the locality several northern forms had been observed, notably the Arctic Three-toed Woodpecker, the Junco, the White-throated Sparrow, and the Pine Siskin, made it desirable to study further the bird life of the river valley. Accordingly another trip was taken.

¹ Bull. Mich. Ornith. Club, Vol. IV, p. 61.

Mr. Gale and the writer started on a second trip from the town of Roscommon, August 8, and floated the length of the Au Sable River, — about three hundred miles, making the trip in fifteen days. Kirtland's Warbler was not seen on this trip, although the localities where it had previously been were carefully searched.¹

The Au Sable River rises in the southwest corner of Otsego County. It flows almost due south to Grayling, whence it bends to the east. It receives two large tributaries in Crawford County, *viz.*: the South Branch, rising in Roscommon County, some twenty miles east of Roscommon, and the North Branch, whose head is in Otsego Lake, Otsego County. Big Creek enters from the south in Oscoda County, and the Lower South Branch in Iosco County, and this completes the number of larger tributaries. The stream drains a topography of glacial origin, and as a consequence frequently cuts through morainal ridges, which give the river its steep bare bluffs of sand or clay. These bluffs are usually crowned with a thin turf bearing stunted jack pines and thick mats of sweet fern. The bluffs alternate with areas of low land, known respectively as cedar and hardwood swamps. The former consist of thick stands of white cedar, balsam, spruce, tamarack, and birches, in varying proportions. In the hardwood swamps white elms predominate, associated with basswood, white and black ash, and red maple. The banks are lined for long stretches with bushy alders. At other places the bank vegetation is of saw-grass, wild rice, milkweeds, golden-rod, cardinal flower, and sour dock, with arrowhead, spatterdock, eel grass, and pickerel weed growing in

¹ During the summer of 1904 I made the following observations with regard to the occurrence of Kirtland's Warbler in Crawford County. On July 21, a male was heard and seen on the top of a high, sandy ridge, a mile north of Higgins Lake. This ridge was covered with an open sprout growth of red, white and scarlet oaks, red maple, black cheery, june-berry, and prairie willow, not over eight feet high. A heavy undergrowth of brake, sweet fern, and huckleberry bushes completely concealed the ground. A pair of these birds was observed at the same locality on successive days for at least a week, but though they were seen with insects in their bills and gave every indication of nesting, I was unable to find the nest. A second pair was observed July 22, about a half mile from the above location, but these birds apparently were not nesting.

the water. Lenticular islands are of frequent occurrence wherever logs or stumps have lodged in the channel.

A noticeable change is to be observed in the tree life of the river as one passes from Crawford and Oscoda counties into the lower waters of Alcona and Iosco counties. Here a gradual increase may be noted in the areas covered by willows and poplars, while swamp oaks, hard and soft maple, and hemlocks tend to replace the soft woods of the cedar swamps. This change in the character of the vegetation is probably due to the varying proportions of high and low lands, the latter, as is usual in the lower and older parts of a river valley, increasing in amount toward the mouth of the river.

The accompanying list of 103 species of birds, in which Mr. Wood's and my notes have been incorporated, was taken from the notes made during each excursion, and thus represents more or less completely the bird life of the valley, for the period from June 13 to September 22. — E. H. F.

The observations and data which I have contributed to the following list were made during two trips on the river in the summer of 1903. The first trip was made in search of the Kirtland Warbler for the University Museum,¹ and extended down the South Branch from Roscommon to the Au Sable, and as far as Big Creek in Oscoda County. This is about seventy miles, by river, from Roscommon. My notes on this trip cover a period of sixteen days, from June 30 to July 16, and therefore at a time when most of the birds were breeding, or feeding young. This gives us a list of the summer residents.

My second trip was made in company with Professor J. E. Reighard. On the morning of Sept. 6, we started down the Au Sable River from Grayling in a boat to make a survey of the life in and along the river. This trip occupied fifteen days and covered a distance of about one hundred miles in a straight line, or about three hundred by the river.

Grayling is a small town of about 1500 inhabitants, and is situated in the western part of Crawford County, Michigan, on the

¹ Bull. Mich. Ornith. Club, Vol. V, pp. 1-13.

eastern side of a high ridge which is the watershed of this part of Michigan, and is the highest land on the lower peninsula. It is 1300 to 1450 feet above the sea. From this watershed in Otsego County starts the Au Sable River, the main stream running south to Grayling about twenty-five miles, then east and southeast to Oscoda on Lake Huron. The North Branch, a good sized stream, also starts in Otsego County and running southeast joins the main stream about thirty miles east of Grayling. This town is built on a high, level, barren terrace of light colored sand and is a poor place for birds. I saw here the English Sparrow, the Song, Vesper, and Chipping Sparrows, a flock of Red-winged Blackbirds, a few Robins and a Marsh Hawk near the river.

The Au Sable River here is small, only two to three rods wide and deep enough to float a small boat; the banks are lined with cedars, most of them dead. I had fine views of the birds which were feeding in the trees along the river. In the dead trees I saw the Hairy, Downy, and Red-headed Woodpeckers (this last species not very common here), Yellow-bellied Sapsucker, both the White and Red-breasted Nuthatches, and the Flickers. These latter and the Blue Jays were never out of sight or sound. In the live cedars and tamaracks I saw the Goldfinches, Kinglets and Myrtle Warblers. We had gone but a few miles when I saw a Lincoln's Sparrow perched in a low bush at the edge of a thick swamp. We had the opportunity (my first) of seeing this rare sparrow at close range, about fifty feet. Its peculiar color and markings make this bird easy to identify. While I was waiting for a better shot the bird disappeared in the thick brush and was not seen again. Near here I saw a Tennessee Warbler, close to the edge of the water, and heard the sharp rattle of a Kingfisher. Flocks of Chickadees were feeding in the cedars, while on the higher banks I saw the Junco.

At the junction of the North Branch with the Au Sable we camped for two days. This was not far from the locality where, in July, I found the Kirtland Warblers breeding, and on Sept. 12 we made a visit to the locality. I did not expect to find any of the birds so late in the season. The spot looked the same as when I last saw it, even to the tree where I first saw the male of the first nest. This bird used this tree as a post of observation

and for song. The day that I found the nest he flew down scolding and alighted near the top of a small jack pine immediately under this tree. Between this tree and the road was the place where I found the first nest.¹

In the immediate vicinity of the nest we saw the Bluebird, Robin, Chipping, Song, and Vesper Sparrows, Slate-colored Junco, White-breasted and Red-breasted Nuthatches, Flicker, Kingbird, Sparrow Hawk, Hairy, Downy, and Red-headed Woodpeckers. I found these birds breeding here in July.

In the cedar swamps and at the edge of the plains bred the Hermit, Wood, and Wilson's Thrushes, also the Ruffed Grouse, Maryland Yellow-throat, Towhee, Brown Thrasher, White-throated Sparrow, Rose-breasted Grosbeak, Indigo Bird, Cedar Bird, Red-eyed Vireo, Black and White Warbler, Nashville and Yellow Warblers, Brown Creeper, Black-throated Blue and Chestnut-sided Warblers, Oven-bird, Black-throated Green Warbler, Catbird, Redstart, Winter Wren, Bob-white (rare), Mourning Dove, Barred Owl, Great Horned Owl, Yellow-billed and Black-billed Cuckoos, Arctic Three-toed Woodpecker (I shot a young bird July 10, 1903), Yellow-bellied Sapsucker, Pileated Woodpecker, Whip-poor-will, Nighthawk, Ruby-throated Hummingbird, Crested Flycatcher, Olive-sided Flycatcher, Least Flycatcher, Wood Pewee, Blue Jay, White-rumped Shrike, Crow, Cowbird, Bronzed Grackle, and American Goldfinch. Along the river bred the Hooded Merganser, Kingfisher, Bank Swallow, Spotted Sandpiper, Great Blue Heron, Bald Eagle, American Woodcock, Phoebe (under the bridges), and Marsh Hawk. I was told that the Spruce or Canada Grouse nested on the plains, but I did not

¹ I think they migrate slowly in the fall, reaching southern Michigan about the fifteenth or twentieth of August. Lynds Jones, in the 'Birds of Ohio,' p. 185, reports seeing two near Ironton, Lawrence Co., Ohio, Aug. 28, 1902. I expect these birds the first two weeks in August at Ann Arbor. Mr. J. A. Parmalee writes me that the last Kirtland seen in this colony in 1903 was Aug. 20, and the last one seen in 1904 was on Sept. 3. His earliest spring record is May 3, 1904, and the earliest nesting record June 6, 1904, a set of three. Mr. Parmalee says: "The male does not help build the nest, but sits near by and sings constantly." He also states that this colony is much larger than in 1903.

see this species. I found hunters who reported that they had taken them in fall or winter.

As we went down the river the descent was very gradual for the first two hundred miles, about 200 feet for every 100 miles, until we reached the rapids in Alcona County where the fall was 269 feet per hundred miles, and perhaps one half of this fall occurs in a distance of five miles.¹

Passing from Alcona into Iosco County, the descent was quite noticeable and the river much swifter. In the lower fifty miles the river was slower and full of islands; the channel also was wide and marshy, with submerged swamps full of dead trees. Here we saw the willow along the river's margin. Below the rapids we saw for the first time extensive meadows, and in them were the Meadowlark and Red-winged Blackbirds.

In the region of highest altitude, or from Grayling, Oscoda County, 1250 feet, down to Flat Rock, Alcona County, about 900 feet, we find some northern forms such as White-throated Sparrow, Junco, Red-breasted Nuthatch, Winter Wren, Hermit Thrush, Olive-sided Flycatcher, Arctic Three-toed Woodpecker, and Kirtland's Warbler, all Canadian fauna. Below 900 feet (to the lake, 581 feet) we found such forms as the Meadowlark, Purple Martin, Yellow-throated Flycatchers, Mourning Dove, and the Red-winged Blackbird. — N. A. W.

ANNOTATED LIST.

1. *Colymbus auritus*. HORNED GREBE.— Alcona Co., Sept. 19, one seen in a bayou.
2. *Podilymbus podiceps*. PIED-BILLED GREBE.— Crawford Co., Sept. 12, very few seen. Oscoda Co., Sept. 15, occasionally seen. Alcona Co., Sept. 20, one seen. Iosco Co., Sept. 21, quite rare.
3. *Merganser americanus*. AMERICAN MERGANSER. — Crawford Co., Sept. 5, two seen. Oscoda Co., Sept. 18, a pair seen at mouth of North Branch. Alcona Co., Sept. 19, a female seen on the river. These were perhaps migrants.
4. *Lophodytes cucullatus*. HOODED MERGANSER.— Crawford Co., June 30. Several females with young were seen on South Branch.

¹ These estimates of altitude were made from data kindly furnished by Mr. Frank Leverett.

On July 1, several broods unable to fly were seen. Oscoda Co. July 1, one young shot; Sept. 13, 16, common. Alcona Co., Sept. 19-20, common. Iosco Co., Sept. 21-22. Common, breeds.

5. *Anas boschas*. MALLARD.—Iosco Co., Sept. 21. Two seen, probably migrants.

6. *Aythya affinis*. LESSER SCAUP DUCK.—Alcona Co., Sept. 19. One seen, no doubt a migrant.

7. *Ardea herodias*. GREAT BLUE HERON.—Crawford Co., Aug. 13, June 30, Sept. 6, occasional. Young and old observed. Oscoda Co., Aug. 19, frequent; July 1, common. Alcona Co., Sept. 19, one seen. Iosco Co., Aug. 22, frequent; Sept. 20-21, a few seen.

8. *Philohela minor*. AMERICAN WOODCOCK.—Crawford Co., Aug. 12, saw three in a swamp of conifers and hardwoods with thick underbrush. Oscoda Co., July 1, near Butler Bridge in elm woods; Sept. 15, mouth of Big Creek, four seen. Reported as breeding by James Buchanan, a resident.

9. *Helodromas solitarius*. SOLITARY SANDPIPER.—Crawford Co., Aug. 8, frequent. Oscoda Co., Aug. 19, frequent. Iosco Co., Aug. 6.

10. *Actitis macularia*. SPOTTED SANDPIPER.—Crawford Co., Aug. 13, June 30, Sept. 6, 12, common. Oscoda Co., June 14, frequent; nest seen (Frothingham); July 2-16, Aug. 7, 16, 19, Sept. 13-15, common. Alcona Co., Sept. 19, common. Iosco Co., Sept. 20, 21, common. Almost constantly in sight of the bird all along the river (Wood).

11. *Colinus virginianus*. BOB-WHITE.—Crawford Co., June 16, occasional; June 30, one heard near Roscommon; Aug. 9, occasional; Sept. 5. A few flocks are said to have worked in near Grayling from the south and west during the last ten years. Alcona Co., Aug. 20, occasional.

12. *Bonasa umbellus*. RUFFED GROUSE.—Crawford Co., Sept. 13, two seen. Oscoda Co., June 13, female and young seen; Aug. 7, 15, frequent; July 4, one seen at Butler Bridge, adult male. Alcona Co., Aug. 20, frequent; Sept. 20, one male shot. Iosco Co., Aug. 22, occasional; Sept. 21, one male shot.

13. *Zenaidura macroura*. MOURNING DOVE.—Crawford Co., Aug. 9, 13, occasional; June 30, Sept. 6, a few pairs seen. Oscoda Co., Aug. 15, July 2, 15, occasional. Alcona Co., Sept. 20, not common. Iosco Co., Sept. 21, one pair observed.

14. *Circus hudsonius*. MARSH HAWK.—Crawford Co., Sept. 5, Grayling, immature male seen. Oscoda Co., July 7, not common. Alcona Co., Aug. 20, one seen.

15. *Accipiter velox*. SHARP-SHINNED HAWK.—Oscoda Co., Aug. 19, a female shot.

16. *Accipiter cooperii*. COOPER'S HAWK.—Crawford Co., Sept. 8, one seen. Oscoda Co., Aug. 15, occasional. Iosco Co., Aug. 22, one seen.

17. *Buteo borealis*. RED-TAILED HAWK.—Crawford Co., Sept. 10, occasionally seen. Oscoda Co., Sept. 15, a pair seen at McKinley. Alcona Co., Aug. 20, two seen; Sept. 20. Iosco Co., Sept. 20, 21, occasional.

18. *Haliaeetus leucocephalus*. BALD EAGLE.—Crawford Co., June 30, two seen, one young bird; Sept. 7, 9, occasional. Heard of one pair breeding on the South Branch.

19. *Falco sparverius*. AMERICAN SPARROW HAWK.—Crawford Co., Aug. 9, occasional; Aug. 13, frequent; June 30, July 10, Sept. 6, common. Breeding in the dead trees on the plains; young seen. Oscoda Co., June 15, Aug. 17, frequent; July 2, 16, Sept. 13, 15, common. Alcona Co., Sept. 19, 20, most common hawk seen. Iosco Co., Sept. 21, commonly seen.

20. *Pandion haliaetus carolinensis*. OSPREY.—Crawford Co., Sept. 9, shot an immature bird at Camp Stevens, eight miles east of Grayling. Probably breeds; a number seen. Oscoda Co., Sept. 15, occasionally seen. Alcona Co., Aug. 20, one seen; Sept. 20. Iosco Co., Sept. 21.

21. *Syrnium varium*. BARRED OWL.—Oscoda Co., Aug. 18, one seen. Alcona Co., Aug. 20, one heard.

22. *Bubo virginianus*. GREAT HORNED OWL.—Crawford Co., June 30, three seen on South Branch, two were young; Aug. 9, common, young shot; Aug. 10, 11, common; Sept. 3, two seen. Oscoda Co., Aug. 13, 17, saw one each day; Aug. 18, 19, common; July 2, Sept. 12, saw a number. Alcona Co., Sept. 19, common. Iosco Co., Sept. 20, 21, common.

23. *Coccyzus americanus*. YELLOW-BILLED CUCKOO.—Oscoda Co., July 4, 12, occasional; probably breeds.

24. *Coccyzus erythrophthalmus*. BLACK-BILLED CUCKOO.—Oscoda Co., July 7, 12, occasional. Iosco Co., Sept. 20, one seen.

25. *Ceryle alcyon*. BELTED KINGFISHER. Crawford Co., Aug. 8–13, common; June 30, July 10, common, breeding in the high banks, young seen; Sept. 6, 12, common. Oscoda Co., June 14, frequent; July 2, 16, Aug. 16, 19, Sept. 10, 14, common. Alcona Co., Sept. 19. Iosco Co., Aug. 22, common; Sept. 20, 21.

26. *Dryobates villosus*. HAIRY WOODPECKER.—Crawford Co., Aug. 9, 13, June 30, July 10, Sept. 6, common. Oscoda Co., June 16, frequent; Aug. 15, common, Aug. 19, frequent; July 2, 16, common, young seen; Sept. 11, common. Iosco Co., Sept. 20, 21.

27. *Dryobates pubescens medianus*. DOWNY WOODPECKER.—Crawford Co., Aug. 13, frequent; June 30, July 10, Sept. 6, 10, common. Oscoda Co., Aug. 17, frequent; July 2, 16, Sept. 13, 15, common. Iosco Co., Aug. 22, frequent, Sept. 20, 21.

28. *Picoides arcticus*. ARCTIC THREE-TOED WOODPECKER.—Crawford Co., July 10, one young female shot two miles west of North Branch; Sept. 12, one shot, adult male, two miles north of the mouth of North Branch. Oscoda Co., June 18, one seen.

29. *Sphyrapicus varius*. YELLOW-BELLIED SAPSUCKER.—Crawford Co., June 15, not common; Aug. 9, 13, frequent; June 30, July 2, common, young shot; Sept. 6, common. Oscoda Co., Aug. 15, occasional; July 2, 16, common; Sept. 15, one immature male shot at mouth of Big Creek. Breeds. Alcona Co., Sept. 19, occasional. Iosco Co., Aug. 22, occasional; Sept. 21, occasional.

30. *Ceophlœus pileatus abieticola*. NORTHERN PILEATED WOODPECKER. — Oscoda Co., July 5. Reported as breeding at Butler Bridge. Alcona Co., Sept. 19, one seen near river bank.

31. *Melanerpes erythrocephalus*. RED-HEADED WOODPECKER. — Crawford Co., Aug. 12, 13, not common; June 30, occasional. Oscoda Co., Aug. 15, frequent; July 2, 15, common in Kirtland Warbler colony, young seen; Sept. 18, McKinley, one immature male shot. Alcona Co., Aug. 20, frequent; Sept. 19. Iosco Co., Aug. 22, frequent; Sept. 20.

32. *Colaptes auratus*. FLICKER. — Crawford Co., Aug. 8, common; Aug. 9, frequent; Aug. 13, common; June 30, July 10, common, breeding on South Branch; Sept. 6, common. Oscoda Co., June 14, Aug. 15, 19, July 2, 16, Sept. 13, common. Alcona Co., Sept. 19, common. Iosco Co., Aug. 6, Aug. 22, frequent; Sept. 20, 21, common. Most common Woodpecker of this section of the State (Wood).

33. *Antrostomus vociferus*. WHIP-POOR-WILL. — Crawford Co., Aug. 8, 12, common; Aug. 13, July 6, frequent; Sept. 9, one shot at Steven's Camp. Oscoda Co., June 14, Aug. 7, 15, frequent; July 5, 15, common; Sept. 13, one heard calling in the evening. Alcona Co., Aug. 19, frequent. Iosco Co., Aug. 22, frequent.

34. *Chordeiles virginianus*. NIGHTHAWK. — Crawford Co., Aug. 8, July 10, common; Aug. 7, common at Mio, pair nesting; Aug. 15, 19, common; July 5, one shot with egg in ovary; very common. Iosco Co., Aug. 22, common.

35. *Chætura pelagica*. CHIMNEY SWIFT. — Crawford Co., Aug. 8, occasional; Aug. 9, 13, frequent; July 10. Oscoda Co., June 18, occasional; July 3, 15, occasionally seen.

36. *Trochilus colubris*. RUBY-THROATED HUMMINGBIRD. — Crawford Co., Aug. 9, common; Aug. 13, frequent; Sept. 10, one seen.

37. *Tyrannus tyrannus*. KINGBIRD. — Crawford Co., Aug. 9, 13, common; June 30, common; July 16, a nest was seen near Roscommon on top of a four-foot stump; it contained four eggs. Oscoda Co., June 13, Aug. 7, at Mio; Aug. 15, at Butler Bridge; Aug. 19, at Mio, common; July 2, 16, common, nest found. Iosco Co., Aug. 6, 22, common. None seen in Sept., they having probably migrated (Wood).

38. *Myiarchus crinitus*. CRESTED FLYCATCHER. — Oscoda Co., June 14, July 7, Aug. 19, occasional.

39. *Sayornis phœbe*. PHÆBE. — Crawford Co., June 30, July 10, Sept. 12, common. Seen near the bridges along the river, nesting under them. Oscoda Co., June 15, occasional, one evidently nesting under a bridge; July 2, 16, Sept. 13. Alcona Co., Aug. 20, one heard; Sept. 19. Iosco Co., Sept. 21.

40. *Nuttallornis borealis*. OLIVE-SIDED FLYCATCHER. — Crawford Co., June 16, seen on tops of jack pines; Aug. 9, one shot. Oscoda Co., June 18, in tops of tall pines, rare.

41. *Contopus virens*. WOOD PEWEE. — Crawford Co., Aug. 9, 13, common; June 30, July 10, Sept. 6, common. Oscoda Co., June 14, Aug. 15,

19, common; July 2, 15, Sept. 13, common. Alcona Co., Sept. 19. Iosco Co., Aug. 6, at Au Sable; Aug. 22, Sept. 21, common.

42. *Empidonax minimus*. LEAST FLYCATCHER.—Ogemaw Co., June 18, common. Crawford Co., June 30, Sept. 12, July 10. Nest on jack pine bough, 2 fresh eggs, two miles west of North Branch. Oscoda Co., July 3, 15, Sept. 12, common. Alcona Co., Sept. 19, common. Iosco Co., Sept. 21, common.

43. *Otocoris alpestris praticola*. PRAIRIE HORNED LARK.—Oscoda Co., July 10, a few seen on the plains; Sept. 18, a flock seen at McKinley. Breeds on plains back from the river; fairly common.

44. *Cyanocitta cristata*. BLUE JAY.—Crawford Co., Aug. 8, 9, frequent; Aug. 13, common; June 30, Sept. 5, common, breeding in pines. Oscoda Co., June 13, frequent; Aug. 15, common; Aug. 19, frequent; July 2, 16, Sept. 13, very common. Alcona Co., Sept. 19. Iosco Co., Aug. 22, Sept. 20, 21, common.

45. *Corvus brachyrhynchos*. AMERICAN CROW.—Crawford Co., Aug. 13, frequent; June 30, Sept. 6, common; young seen. Oscoda Co., June 13, Aug. 15, frequent; July 2, 16, Sept. 12. Alcona Co., Aug. 20, frequent; Sept. 19, common. Iosco Co., Aug. 22, occasional; Sept. 20, 21, common.

46. *Dolichonyx oryzivorus*. BOBOLINK.—Oscoda Co., July 4. Reported at Luzerne (Royce) as breeding in clover meadows.

47. *Molothrus ater*. COWBIRD.—Crawford Co., June 30, common, young seen. Oscoda Co., June 14, common near Butler Bridge; July 2, 16, common. Not seen in Sept.

48. *Agelaius phoeniceus*. RED-WINGED BLACKBIRD.—Iosco Co., Sept. 19, a large flock seen and heard singing near the river.

49. *Sturnella magna*. MEADOWLARK.—Oscoda Co., July 5, occasional. Reported as breeding in meadows near Luzerne (Royce). Alcona Co., Sept. 19, common in old meadows. Iosco Co., Aug. 6.

50. *Icterus galbula*. BALTIMORE ORIOLE.—Oscoda Co., July 4, Luzerne. Reported breeding by a resident, Mr. O. Royce.

51. *Quiscalus quiscula æneus*.—BRONZED GRACKLE.—Crawford Co., June 16, frequent; Aug. 13, June 30, Sept. 6, common; Sept. 13. Oscoda Co., July 2, 16, common; breeding in pines along the river near Butler Bridge. Alcona Co., Sept. 19, a few seen. Iosco Co., Aug. 6, Aug. 22, frequent; Sept. 21.

52. *Carpodacus purpureus*. PURPLE FINCH.—Oscoda Co., Aug. 15, shot one in scrub oaks, several seen. Iosco Co., Aug. 22, saw one on the river bank.

53. *Loxia curvirostra minor*. AMERICAN CROSSBILL.—Oscoda Co., Aug. 7, at Mio; saw one close at hand, others flying.

54. *Astragalinus tristis*. AMERICAN GOLDFINCH.—Crawford Co., June 16, 30, Aug. 9, 13, common. Saw them on the South Branch. Sept. 6, common. Oscoda Co., June 15, Aug. 15, 19. July 2, 16, Sept. 12, common. Saw them on the North Branch. Alcona Co., Sept. 19, com-

mon. Some in full plumage. Iosco Co., Aug. 6, common. At Au Sable Aug. 22, common; Sept. 20, 21, common.

55. *Spinus pinus*. PINE SISKIN. — Crawford Co., Aug. 12, common; flocks seen passing overhead. Oscoda Co., Aug. 15, occasionally seen.

56. *Poæcetes gramineus*. VESPER SPARROW. — Crawford Co., June 16, frequent among jack pines and low oaks; Aug. 8, common; Aug. 13, frequent; June 30, Sept. 6, common along South Branch of Au Sable, and on the main stream. Oscoda Co., June 13, Aug. 15, common; July 2, 16, Sept. 13, common, breeding. Iosco Co., Sept. 20, 21, common.

57. *Zonotrichia albicollis*. WHITE-THROATED SPARROW. — Crawford Co., June 16, frequent, evidently nesting in a cedar swamp; Aug. 8, 9, 13, frequent; June 30, young seen; Sept. 6. Oscoda Co., June 13, frequent; June 14, nesting; Aug. 7, 16, frequent; July 2, Sept. 12, a few seen. Alcona Co., Aug. 20, occasional.

58. *Spizella monticola*. TREE SPARROW. — Iosco Co., Aug. 6. In flock with Juncos.

59. *Spizella socialis*. CHIPPING SPARROW. — Crawford Co., June 15. Aug. 13, common; June 30, July 15, Sept. 6, North Branch. I found a nest in a small jack pine near the Kirtland Warbler colony (Wood). Oscoda Co., June 13, Aug. 7, at Mio; Aug. 15, common; July 2, 16, common, Butler Bridge. Breeding, young seen. Alcona Co., Sept. 19, common. Iosco Co., Aug. 6, at Au Sable; Sept. 20, 21, very common.

60. *Spizella pusilla*. FIELD SPARROW. — Crawford Co., Aug. 8, common in jack pines; June 17, occasional. Oscoda Co., Aug. 7, frequent, at Mio.

61. *Junco hyemalis*. SLATE-COLORED JUNCO. — Crawford Co., July 10, Sept. 12, common. Oscoda Co., June 15, feeding young; Aug. 15, frequent in jack pines; July 2, 15, common, breeding in the same locality with Kirtland's Warbler (Wood); Sept. 13, 15. Alcona Co., Sept. 19. Iosco Co., Aug. 6, in flock with *Spizella monticola*; Aug. 24, at Au Sable, frequent; Sept. 20, 21, common.

62. *Melospiza cinerea melodia*. SONG SPARROW. — Crawford Co., June 16, common, shot young; Aug. 8, 9, 13, common; June 30, common; seen on South Branch; Sept. 6, common. Oscoda Co., June 13, common; Aug. 15, frequent. July 2, Sept. 12, common. Breeding in vicinity of the Kirtland Warbler colony (Wood). Alcona Co., Aug. 19, Sept. 19, common. Iosco Co., Aug. 6, Au Sable; Aug. 22, Sept. 20, 21, common.

63. *Melospiza lincolni*. LINCOLN'S SPARROW. — Crawford Co., Sept. 6. I saw one a few miles east of Grayling on the edge of the Au Sable River in thick brush, evidently on its way south (Wood).

64. *Pipilo erythrophthalmus*. TOWHEE. — Crawford Co., Aug. 8, 9, common; Aug. 13, frequent; Sept. 6, June 30, common; breeds in same locality as Kirtland's Warbler (Wood). Oscoda Co., June 13, July 2, 15, Aug. 15, Sept. 13, common. Alcona Co., Sept. 19. Iosco Co., Aug. 22, Sept. 20, 22, common.

65. *Zamelodia ludoviciana*. ROSE-BREASTED GROSBEAK. — Crawford

Co., Aug. 9, occasional. Oscoda Co., June 14, occasional; Aug. 15, 19, frequent.

66. *Cyanospiza cyanea*. INDIGO BUNTING.—Oscoda Co., Aug. 16, one pair nesting.

67. *Piranga erythromelas*. SCARLET TANAGER.—Oscoda Co., July 2, 15, occasional. Reported as seen near Luzerne by O. Royce. Alcona Co., Aug. 20, heard one in a swamp. Iosco Co., Aug. 21, shot a female; Aug. 22.

68. *Progne subis*. PURPLE MARTIN.—Iosco Co., at Au Sable, only observed at the mouth of the river.

69. *Hirundo erythrogastra*. BARN SWALLOW.—Crawford Co., July 1, a few seen. Oscoda Co., July 5, occasionally seen about old barns.

70. *Riparia riparia*. BANK SWALLOW.—Crawford Co., Aug. 9, frequent; June 30, occasional. A few seen on South Branch. Oscoda Co., July 2, 15, occasional. Nests were seen all along the river in the steep banks, just beneath the sod (Frothingham). Common all along the river; none seen in September (Wood).

71. *Ampelis cedrorum*. CEDAR WAXWING.—Crawford Co., Aug. 9, 13, common; June 30, common on South Branch; Sept. 6, common. Oscoda Co., June 14, July 2, Aug. 15, 19, Sept. 6, common. Alcona Co., Sept. 19, occasional, Iosco Co., Aug. 22, frequent; Sept. 20, 21, occasional.

Cedar birds were very common along the upper waters in August. They perched like flycatchers on dead limbs overhanging the water, making zig-zag excursions now and then whose object seemed to be catching insects. The birds decreased in numbers as we neared the south bend of the river, though they were of quite frequent occurrence all the way down (Frothingham). Seen all along the river (Wood).

72. *Lanius ludovicianus migrans*. MIGRANT SHRIKE.—Oscoda Co., July 2, 15; five young shot and nest taken on Jack Pine Plain $\frac{1}{2}$ mile south of river near Butler Bridge. July 4, one shot near Mio by Dr. W. B. Hinsdale who also saw several more.

73. *Vireo olivaceus*. RED-EYED VIREO.—Crawford Co., Aug. 8, common; Sept. 8, occasional. Oscoda Co., June 13, frequent; Aug. 15, 19, common; July 10, occasional. Iosco Co., Aug. 6, common.

74. *Vireo gilvus*. WARBLING VIREO.—Crawford Co., June 30, on the South Branch; rare.

75. *Vireo flavifrons*. YELLOW-THROATED VIREO.—Alcona Co., Sept. 20, one shot near bank of Au Sable by Prof. J. E. Reighard.

76. *Mniotilta varia*. BLACK AND WHITE WARBLER.—Crawford Co., Aug. 9, occasional; July 15, one young seen on Big Creek. Oscoda Co., June 18, female shot in hardwood swamp; Sept. 10.

77. *Helminthophila ruficapilla*. NASHVILLE WARBLER.—Crawford Co., Aug. 10, occasional, in swamp, with berry-bushes and poplars. Oscoda Co., June 18, frequent on low old-pine land. Aug. 16, frequent; a family seen.

78. *Helminthophila peregrina*. TENNESSEE WARBLER.—Crawford Co., Sept. 6, one seen a few miles east of Grayling, at the edge of the river, probably migrating (Wood).

79. *Dendroica aestiva*. YELLOW WARBLER.—Crawford Co., Aug. 9, occasional, song heard; June 29, South Branch, occasional.

80. *Dendroica caerulescens*. BLACK-THROATED BLUE WARBLER.—Crawford Co., Sept. 9, one shot at Stevens Camp, eight miles east of Grayling. Not common. Saw this warbler in Ogemaw Co., five miles north of West Branch, June 19, in hardwoods; probably breeding (Frothingham).

81. *Dendroica coronata*. MYRTLE WARBLER.—Crawford Co., Sept. 6, occasionally seen; probably on its way south. Oscoda Co., Aug. 15, shot a moulting female, the only one seen, in a swamp of white pine, etc.

82. *Dendroica pensylvanica*. CHESTNUT-SIDED WARBLER.—Crawford Co., Aug. 10, pair seen feeding young. Oscoda Co., June 18, one male seen.

83. *Dendroica blackburniae*. BLACKBURNIAN WARBLER.—Oscoda Co., Aug. 17, one male seen.

84. *Dendroica virens*. BLACK-THROATED GREEN WARBLER.—Crawford Co., Aug. 10, a family seen at Camp Douglas on the South Branch. Oscoda Co., Aug. 15, saw family in swamp of birch, white pine, alder and dogwood; June 18, frequent. Iosco Co., Aug. 6, saw family in jack pines two miles from Oscoda; Aug. 24, common, old and young, in same pines. Sept. 20, 21, common.

85. *Dendroica kirtlandi*. KIRTLAND'S WARBLER.—Crawford Co., July 8, one shot (Wood); July 9, three seen (Wood); July 10, one shot (Wood); July 11, two shot (Wood); July 13, two shot (Wood); July 15, male shot (T. G. Gale); June 15, several seen and songs heard (Frothingham). Oscoda Co., July 2, one shot (Wood); July 7, one shot (Wood); July 7, several seen and heard (Wood). Breeds. Two nests taken in July with egg and young (Wood).

86. *Seiurus aurocapillus*. OVEN BIRD.—Crawford Co., Aug. 11, frequent at Camp Douglas; June 29, 30, at Camp Douglas. Oscoda Co., June 13, frequent; July 2, 16, common. Iosco Co., Aug. 24, saw one in jack pines at Oscoda.

87. *Geothlypis trichas*. MARYLAND YELLOW-THROAT.—Crawford Co., Aug. 9, 13, frequent; July 1-12, breeding at the edge of a swamp where I heard them singing every day (Wood); Sept. 6, occasional. Oscoda Co., June 13, 18, frequent; Sept. 9, a female seen.

88. *Setophaga ruticilla*. AMERICAN REDSTART.—Crawford Co., Aug. 9, frequent; June 31. Oscoda Co., July 1, occasionally seen; Sept. 7, not very common. Saw and heard a male singing in hardwoods five miles north of West Branch, Ogemaw Co., on June 19 (Frothingham).

89. *Galeoscoptes carolinensis*. CATBIRD.—Crawford Co., June 15, Aug. 8, 9, 13, frequent; July 1, Sept. 5, common; breeds; young seen.

Oscoda Co., Aug. 15, frequent; July 2, 15, Sept. 13. Alcona Co., Sept. 19. Iosco Co., Sept. 20, 21.

90. *Toxostoma rufum*. BROWN THRASHER.—Crawford Co., June 15, young and adult seen; Aug. 8, 9, 13, frequent; June 29, frequent; Sept. 6. Common, breeds on plains. Oscoda Co., Aug. 15, frequent; July 2, 15. Alcona Co., Sept. 19. Iosco Co., Sept. 20, 21, common.

92. *Troglodytes ædon*. HOUSE WREN.—Crawford Co., June 29, occasional, near Grayling, probably breeding. Iosco Co., Aug. 6; frequent at Au Sable.

93. *Olbiorchilus hiemalis*. WINTER WREN.—Crawford Co., Aug. 9, occasional; July 1, one seen near Roscommon; breeds in the slashings. Oscoda Co., Aug. 17, frequent.

93. *Certhia familiaris americana*. BROWN CREEPER.—Oscoda Co., rare; July 4, one shot; a few probably breed; young seen.

94. *Sitta carolinensis*. WHITE-BREASTED NUTHATCH. —Crawford Co., Aug. 10, Sept. 6, July 11, frequent, young seen; Aug. 19, Sept. 17, July 2, frequent. Alcona Co., Sept. 19. Iosco Co., Aug. 22, Sept. 20, 21, frequent.

95. *Sitta canadensis*. RED-BREASTED NUTHATCH. —Oscoda Co., Sept. 17, one shot; July 4, one shot. Saw them in jack and Norway pines; common. Iosco Co., Aug. 24, saw five or six in jack pines with Chickadees.

96. *Parus atricapillus*. CHICKADEE. —Crawford Co., Aug. 9, 13, common; July 1, Sept. 5, common in pines; breeds, young birds seen. Oscoda Co., June 14, Aug. 15, 19, Sept. 13, common; July 2, 15. Alcona Co., Sept. 19. Iosco Co., Aug. 6, 24, common at Au Sable; Aug. 22, Sept. 20, 21, common.

97. *Regulus satrapa*. GOLDEN-CROWNED KINGLET. —Crawford Co., Sept. 6, occasionally seen, probably migrating.

98. *Poliophtila cærulea*. BLUE-GRAY GNATCATCHER. —Crawford Co., Aug. 10, two seen.

99. *Hylocichla mustelina*. WOOD THRUSH. —Crawford Co., Sept. 9, one seen at Steven's Camp, eight miles east of Grayling. Oscoda Co., July 4, 15, common.

100. *Hylocichla fuscescens*. WILSON'S THRUSH. —Oscoda Co., July 6, 15, occasionally seen.

101. *Hylocichla guttata pallasii*. HERMIT THRUSH. —Crawford Co., Aug. 11, frequent; July 1, occasional on South Branch; Sept. 6, occasional. Oscoda Co., June 14, frequent; July 11, frequently seen and heard. Saw a number of thrushes on the upper waters but was unable to identify them. Shot a young of this species (probably) at Butler Bridge on Aug. 17. Oscoda Co. (Frothingham).

102. *Merula migratoria*. AMERICAN ROBIN. —Crawford Co., June 17, July 1, 11, Aug. 9, 13, Sept. 6–12, common. Oscoda Co., June 13, July 2, Aug. 7, 15, 19, at Mio, Sept. 13, common. Alcona Co., Sept. 20, Aug. 22. Iosco Co., Aug. 6, Sept. 21, 22. This bird was one of the most common species.

103. *Sialia sialis*. BLUEBIRD. — Crawford Co., Sept. 12, saw a number in the Kirtland Warbler region (Wood). Oscoda Co., June 13, Aug. 17, occasional; July 6, frequent; Sept. 12, very common, breeding, young seen. Alcona Co., Aug. 19, frequent. Iosco Co., Aug. 22, frequent.

UNIVERSITY MUSEUM, UNIV. OF MICHIGAN,
October, 1904.

REGURGITATIVE FEEDING OF NESTLINGS.

BY IRENE G. WHEELOCK.¹

My claim upon your attention this morning lies in the fact that many years of field work, averaging three to five months each year, have been spent about equally divided between California and Illinois in obtaining the data which I shall present for your consideration. I am confident that it is accurate, and I believe that it is new. The field is large, it is practically unworked, and it offers a rich opportunity for original research.

Realizing that there is time to present only a small proportion of the mass of data at hand, I will pack facts closely and select from my records species representing as many families as possible. Of course it is necessary to record many broods of each species before we can claim that any peculiarity observed is a habit of that species. Having records of one hundred and eighty-seven broods (*not species*), I claim that every brood hatched in a naked or semi-naked condition was fed by regurgitation from a period varying from one day to four weeks. To those critics who believe that their own observations prove this statement untrue I would address two questions: First, *Have you determined accurately the age of the brood at the date of the record?* Because some birds regurgitate for one day only.

Second, *Just what is understood by "Regurgitation?"* As defined by Worcester, Webster and others it means "a flowing back," and

¹ Read at the Twenty-second Congress of the American Ornithologists' Union, Cambridge, Mass., November 29, 1904.